

CURRICULUM VITAE

Richard E. Shaw, M.A., Ph.D., F.A.C.C., F.A.C.A. 21

PEER-REVIEWED JOURNAL ARTICLES

1. Shaw RE, Gaynor J. Goal oriented evaluation for program planning: a case study. **Evaluation and Program Planning** 1982;5:141-148.
2. Hargreaves WA, Shaw RE, Shadoan R, Walker E, Surber R, Gaynor J. Measuring case management activity. **Journal of Nervous and Mental Diseases** 1984;172:296-300.
3. Shaw RE, Cohen F, Doyle B, Palesky J. The impact of denial and repressive style on information gain and rehabilitation outcomes in myocardial infarction patients. **Psychosomatic Medicine** 1985;47(3):262-273.
4. George BS, Myler RK, Stertz SH, Clark DA, Cote G, Shaw RE, Fishman-Rosen J, Murphy C. Balloon angioplasty of coronary bifurcation lesions - the kissing balloon technique. **Catheterization and Cardiovascular Diagnosis** 1986;12:124-138.
5. Shaw RE, Cohen F, Fishman-Rosen J, Murphy MC, Stertz SH, Clark DA, Myler RK. Psychologic predictors of psychosocial and medical outcomes in patients undergoing coronary angioplasty. **Psychosomatic Medicine** 1986;48(8):582-597.
6. Myler RK, Stertz SH, Clark DA, Shaw RE, Fishman-Rosen J, Murphy MC. Coronary angioplasty at the time of initial cardiac catheterization: "ADHOC" angioplasty possibilities and challenges. **Catheterization and Cardiovascular Diagnosis** 1986;12:213-214.
7. Cote J, Myler RK, Stertz SH, Clark DA, Fishman-Rosen J, Murphy MC, Shaw RE. Percutaneous transluminal angioplasty of stenotic coronary artery bypass grafts: 5 years' experience. **Journal of the American College of Cardiology** 1987;9:8-17.
8. Myler RK, Topol EJ, Shaw RE, Stertz SH, Clark DA, Fishman-Rosen J, Murphy MC. Multiple vessel coronary angioplasty: classification, results and patterns of restenosis in 494 consecutive patients. **Catheterization and Cardiovascular Diagnosis** 1987;13:1-15.
9. Myler RK, Shaw RE, Stertz SH, Clark DA, Fishman-Rosen J, Murphy MC. Recurrence after coronary angioplasty. **Catheterization and Cardiovascular Diagnosis** 1987;13:77-86.
10. McChesney JA, Shaw RE, Fishman-Rosen J, Murphy MC, Ryan C. Transdermal clonidine therapy in the treatment of hypertension: a new approach to improve control. **Comprehensive Therapy** 1987;13:49-53.
11. Shaw RE, Myler RK, Stertz SH, Clark DA. Recurrence after coronary angioplasty: prediction and prevention. **Cardio** 1987;4:42-45.
12. Ellis SG, Roubin GS, King SB, Douglas JS, Shaw RE, Stertz SH, Myler RK. In-hospital cardiac mortality after acute closure after coronary angioplasty: analysis of risk factors from 8207 procedures. **Journal of the American College of Cardiology** 1988;II(2):211-216.
13. Murphy MC, Fishman J, Shaw RE. Education of Patients undergoing coronary angioplasty: factors affecting learning during a structured educational program. **Heart and Lung** 1989;18:36-45.

CURRICULUM VITAE

Richard E. Shaw, M.A., Ph.D., F.A.C.C., F.A.C.A. 22

14. **Shaw RE**, Hargreaves WH, Surber R, Luft L, Shadoan R. Continuity and intensity of case management activity in three CMHC's. **Hospital and Community Psychiatry** 1990;41:323-326.
15. Bergin P, Myler RK, **Shaw RE**, Stertz SH, Clark DA, Ryan C, Murphy MC. Transluminal coronary angioplasty in the treatment of silent ischemia. **Catheterization and Cardiovascular Diagnosis** 1988;15:223-228.
16. **Shaw RE**, Stertz SH, Myler RK, O'Donnell MJ. Current status of coronary angioplasty in the setting of multivessel disease. **Cardio** 1988;5:150-154,202.
17. Hecht HS, **Shaw RE**, Bruce T, Myler RK. Silent ischemia: evaluation by exercise and redistribution tomographic thallium-201 imaging. **Journal of the American College of Cardiology** 1989;14:895-900.
18. Stertz SH, **Shaw RE**, Myler RK, O'Donnell MJ. The setting of coronary angioplasty in multivessel disease: current status and future directions. **Cardiology Clinics** 1989;7(4):771-782.
19. Ellis SG, **Shaw RE**, Gershony G, Thomas R, Roubin GS, Douglas JS, Topol EJ, Stertz SH, Myler RK, King SB. Risk factors, time course and treatment effect for restenosis after successful coronary angioplasty of chronic total occlusion. **The American Journal of Cardiology** 1989;63:897-901.
20. Myler RK, Stertz SH, Cumberland DC, Webb JG, **Shaw RE**. Coronary angioplasty: Indications, contraindications and limitations. Historical perspective and technological determinants. **Journal of Interventional Cardiology** 1989;2:179-185.
- Myler RK, Stertz SH, Cumberland DC, **Shaw, RE**. Multiple vessel angioplasty. **The Journal of Invasive Cardiology** 1989;1:191-197.
22. Ellis SG, **Shaw RE**, King SB, Myler RK, Topol EJ. Restenosis after excellent angiographic angioplasty results for chronic total coronary artery occlusion - implications for newer percutaneous revascularization devices. **The American Journal of Cardiology** 1989;64:667-668.
23. Dorros G, Lewin RF, Stertz SH, King JF, Waller BF, Myler RK, Mathiak L, Murphy M, **Shaw RE**, Assa J, Anderson AJ. Percutaneous transluminal aortic valvuloplasty - the acute outcome and followup of 149 patients who underwent the double balloon technique. **European Heart Journal** 1990;11:429-440.
24. Nguyen K PV, **Shaw RE**, Myler RK, Webb JG, Stertz SH. Does coronary angioplasty cause progression of atherosclerotic disease? **Catheterization and Cardiovascular Diagnosis** 1990;21:1-6.
25. Myler RK, **Shaw RE**, Stertz SH, Bashour TT, Ryan C, Hecht HS, Cumberland DC. Unstable angina and coronary angioplasty. **Circulation** 1990;(suppl II):II-88-II-95.
26. Webb JG, Myler RK, **Shaw RE**, Anwar A, Murphy MC, Fishman Mooney J, Mooney MR, Stertz SH. Bidirectional crossover and late outcome after coronary angioplasty and bypass surgery: 8 to 11 year follow-up. **Journal of the American College of Cardiology** 1990;16:57-65.
27. Webb JG, Anwar A, **Shaw RE**, Stertz SH Myler RK. Coronary angioplasty in young adults: initial results and late outcome. **Journal of the American College of Cardiology** 1990;16:1569-1574.

CURRICULUM VITAE

Richard E. Shaw, M.A., Ph.D., F.A.C.C., F.A.C.A. 23

28. **Shaw RE**, Anwar A, Myler RK, Stertz SH, Murphy MC, Hansell HN. Incomplete revascularization and complex lesion morphology: relationship to early and late outcome after multivessel coronary angioplasty. **The Journal of Invasive Cardiology** 1990;2:93-101.
29. Myler RK, Frink RJ, **Shaw RE**, Bashour TT, Hecht HS, Ryan C, Cumberland DC, Stertz SH. The unstable plaque: pathophysiology and therapeutic implications. **The Journal of Invasive Cardiology** 1990;2:117-128.
30. Anwar A, Mooney MR, Stertz SH, Fishman Mooney J, **Shaw RE**, Madison JD, VanTassel RA, Myler RK. Intra-aortic balloon counterpulsation support for elective coronary angioplasty in the setting of poor left ventricular function: a two-center experience. **The Journal of Invasive Cardiology** 1990;2:175-180.
31. Webb JG, Myler RK, **Shaw RE**, Anwar A, Mayo J, Murphy MC, Cumberland DC, Stertz SH. Coronary angioplasty after coronary bypass surgery: initial results and late outcome in 422 patients. **Journal of the American College of Cardiology** 1990;16(4):812-820.
32. Bowes RJ, Oakley GD, Fleming JS, Myler RK, Stertz SH, **Shaw RE**, Cumberland DC. Early clinical experience with a hot tip laser wire in patients with chronic coronary artery occlusions. **The Journal of Invasive Cardiology** 1990;2:241-245.
33. Hecht HS, **Shaw RE**, Bruce TR, Ryan C, Stertz SH, Myler RK. Usefulness of tomographic thallium-201 imaging for detection of restenosis after percutaneous transluminal coronary angioplasty. **The American Journal of Cardiology** 1990;66:1314-1318.
- Anwar A, Myler RK, Nguyen KPV, **Shaw RE**, Webb JG, Anwar LB, Murphy MC, Cumberland DC, Stertz SH. Combined coronary angioplasty, urokinase and heparin in the treatment of acute ischemic syndromes. **The Journal of Invasive Cardiology** 1991;3(1):41-48.
35. Hecht HS, **Shaw RE**, Chin H, Ryan C, Stertz SH, Myler RK. Silent ischemia after coronary angioplasty: evaluation of restenosis and extent of ischemia in asymptomatic patients by tomographic thallium-201 exercise imaging and comparison with symptomatic patients. **Journal of the American College of Cardiology** 1991;17(3):670-677.
36. Myler RK, Webb JG, Nguyen KPV, **Shaw RE**, Anwar A, Schechtman NS, Bashour T, Stertz SH, Zapolanski A. Coronary angioplasty in octogenarians: comparisons to coronary bypass surgery. **Catheterization and Cardiovascular Diagnosis** 1991;23:3-9.
37. Zapolanski A, Rosenblum J, Myler RK, **Shaw RE**, Stertz SH, Millhouse FG, Zatzkis M, Wulff C, Schechtman NS, Siegel S, Bronstein M, Ellertson D, Leary L. Emergency coronary artery bypass surgery following failed balloon angioplasty: role of the internal mammary artery graft. **Journal of Cardiac Surgery** 1991;6:439-448.
38. Myler RK, Stertz SH, **Shaw RE**. Coronary angioplasty and coronary bypass surgery. **The Journal of Invasive Cardiology** 1991;3:180-190.
39. Ellis SG, Myler RK, King III SB, Douglas JS, Topol EJ, **Shaw RE**, Stertz SH, Roubin GS, Murphy MC. Causes and correlates of cardiac death after unsupported coronary angioplasty: implications for the use of advanced support techniques. **The American Journal of Cardiology** 1991;68:1447-1451.
40. **Shaw RE**. Meta-analysis: a controversial technique for combining research results. **The Journal of Invasive Cardiology** 1992;4:34-38.

CURRICULUM VITAE

Richard E. Shaw, M.A., Ph.D., F.A.C.C., F.A.C.A. 24

41. Myler RK, Shaw RE, Stertz SH, Hecht HS, Ryan C, Rosenblum J, Cumberland DC, Murphy MC, Hansell HN, Hidalgo B. Lesion morphology and coronary angioplasty: current experience and analysis. **Journal of the American College of Cardiology** 1992;19:1641-1652.
42. Rosenblum J, Stertz SH, Shaw RE, Hidalgo B, Hansell HN, Murphy MC, Myler RK. Rotational ablation of balloon failures. **The Journal of Invasive Cardiology** 1992;4:312-318.
43. Myler RK, Shaw RE, Stertz SH, Zipkin RE, Rosenblum J, Hecht HS, Ryan C, Briskin JG, Dunlap RW, Hanson CL, Zapolanski A, Cumberland DC. There is no such thing as "restenosis". **The Journal of Invasive Cardiology** 1992;4:282-290.
44. Huber J, Fishman Mooney J, Shaw RE, Myler RK, Stertz SH, Van Tassel RA, Mooney MR. Restenosis presenting as total occlusion after percutaneous transluminal coronary angioplasty: clinical parameters and efficacy of repeat angioplasty. **The Journal of Invasive Cardiology** 1992;4:376-382.
45. Stertz SH, Rosenblum J, Sugeng I, Shaw RE, Hidalgo B, Ward K, Hansell HN, Murphy MC, Myler RK. Coronary rotational ablation: Initial experience in 302 procedures. **Journal of the American College of Cardiology** 1993;21:287-295.
46. Shaw RE. Outcomes in cardiology research: how much are we willing to compromise? **The Journal of Invasive Cardiology** 1993;5:23-27.
- Hecht HS, DeBord L, Shaw RE, Dunlap R, Ryan C, Stertz SH, Myler RK. Usefulness of supine bicycle stress echocardiography for detection of restenosis after percutaneous transluminal coronary angioplasty. **The American Journal of Cardiology** 1993;71:293-296.
48. Hecht HS, DeBord L, Shaw RE, Dunlap R, Ryan C, Stertz SH, Myler RK. Digital supine bicycle stress echocardiography: a new technique for evaluating coronary artery disease. **Journal of the American College of Cardiology** 1993;21:950-956.
49. Shaw RE, Myler RK, Murphy MC, Mooney J, Hansell HS, Stertz SH. The evolution of a clinical database to evaluate the treatment of coronary artery disease. **The Journal of Invasive Cardiology** 1993;5:162-169.
50. Myler RK, Shaw RE, Stertz SH, Pomerantsev E, Raju P, Zipkin RE. A classification system for coronary angioplasty based upon atheroma burden. **The Journal of Invasive Cardiology** 1993;5:153-161.
51. Baciewicz PA, Shaw RE, Myler RK, Stertz SH, Zapolanski A, Murphy MC, Hansell HN, Chan J, Leary L. Late outcome of multivessel coronary artery disease after angioplasty or bypass surgery. **The Journal of Invasive Cardiology**, 1993;5:179-187.
52. Hecht HS, DeBord L, Sotomayor N, Shaw RE, Dunlap R, Ryan C. Supine bicycle stress echocardiography: peak exercise imaging is superior to post exercise imaging. **Journal of the American Society of Echocardiography** 1993;6:265-271.
53. Hecht HS, DeBord L, Shaw RE, Ryan C, Dunlap R, Stertz SH, Myler RK. Supine bicycle stress echocardiography versus tomographic thallium-201 exercise imaging for the detection of coronary artery disease. **Journal of the American Society of Echocardiography** 1993;6:177-185.

CURRICULUM VITAE

Richard E. Shaw, M.A., Ph.D., F.A.C.C., F.A.C.A. 25

54. Murphy MC, Hansell HN, Ward K, **Shaw RE**. Differences in symptoms during and post PTCA versus rotational ablation. **Progress in Cardiovascular Nursing** 1994;9(2):4-9.
55. Hecht HS, DeBord L, Sotomayor N, **Shaw RE**, Ryan C. Truly silent ischemia and the relationship of chest pain and ST segment changes to the amount of ischemic myocardium: evaluation by supine bicycle echocardiography. **Journal of the American College of Cardiology** 1994;23:369-376.
56. Stertz SH, Rosenblum J, **Shaw RE**, Zipkin RE, Hidalgo B, Murphy MC, Myler RK, Ryan C. Restenosis following successful rotational ablation of de novo coronary stenoses. **The Journal of Invasive Cardiology** 1993;5:295-301.
57. Myler RK, **Shaw RE**, Stertz SH, Hecht HS, Ryan C. Restenosis after coronary angioplasty: pathophysiology and therapeutic implications (part 1 of two parts). **The Journal of Invasive Cardiology** 1993;5:295-301.
58. Myler RK, **Shaw RE**, Stertz SH, Hecht HS, Ryan C, Cumberland D. Restenosis after coronary angioplasty: pathophysiology and therapeutic implications (part 2 of two parts). **The Journal of Invasive Cardiology** 1993;5:319-333.
59. Myler RK, **Shaw RE**, Stertz SH, Zapolanski A, Zipkin R, Murphy MC, Hecht H, Chan J, Mengarelli L, Cumberland DC, Ryan C. Triple vessel revascularization: Coronary angioplasty versus coronary artery bypass surgery. Initial results and five-year followup. Comparative costs and loss of working days and wages. **The Journal of Invasive Cardiology** 1994;6:125-135.
60. Stertz SH, Pomerantsev EV, **Shaw RE**, Boucher RA, Millhouse F, Zipkin RE, Hidalgo BO, Murphy MC, Hansell HN, Myler RK. Comparative study of the angiographic morphology of coronary artery lesions treated with PTCA, directional coronary atherectomy or high-speed rotational ablation. **Catheterization and Cardiovascular Diagnosis** 1994;33:1-9.
61. Weyrens FJ, Goldenberg I, Fishman Mooney J, Holmes DR, O'Keefe J, Myler RK, **Shaw RE**, Weintraub W, Cowley M, Kern M, Nahhas AT, Mooney MR. Coronary angioplasty in patients above age 90: a multi-center evaluation. **The American Journal of Cardiology** 1994;74:397-398.
62. Pomerantsev EV, Stertz SH, **Shaw RE**. Quantitative left ventriculography: Methods of assessment of the regional contractility. **The Journal of Invasive Cardiology** 1995;7:11-18.
63. Myler RK, Ryan C, Dunlap R, **Shaw RE**, Bashour TT, Cumberland DC, Mooney MR. Dyslipoproteinemias in atherosclerosis, thrombosis and restenosis after coronary angioplasty. **The Journal of Invasive Cardiology** 1995;7:33-46.
64. **Shaw RE**, Myler RK. Evolving balloon inflation strategies: analysis of patterns over 15 years and relationship to lesion morphology. **The Journal of Invasive Cardiology** 1995;7(Suppl B):10B-16B.
65. O'Murchu B, Foreman RD, **Shaw RE**, Brown DL, Peterson KL, Buchbinder M. The role of intraaortic balloon pump counterpulsation in high-risk coronary rotational atherectomy. **Journal of the American College of Cardiology** 1995;26:1270-1275.
66. Stertz SH, Pomerantsev EV, Fitzgerald PJ, **Shaw RE**, Walton AS, Singer AH, Yeung A, Yock PG, Oesterle SN. Effects of technique modification on immediate results of high-speed rotational atherectomy in 710 procedures on 656 patients. **Catheterization and Cardiovascular Diagnosis** 1995;36:304-310.

CURRICULUM VITAE

Richard E. Shaw, M.A., Ph.D., F.A.C.C., F.A.C.A. 26

67. Stertz SH, Pomerantsev EV, Fitzgerald PJ, Yock PG, Yeung AC, **Shaw RE**, Walton AS, Singer AH, Sanders WJ, Oesterle SN. High-speed rotational atherectomy: six-month serial quantitative coronary angiography follow-up. **American Heart Journal** 1996;131:639-648.
68. Walton AS, Pomerantsev EV, Oesterle SN, Yeung AC, Singer AH, **Shaw RE**, Stertz SH. Outcome of narrowing related side branches after high-speed rotational atherectomy. **American Journal of Cardiology** 1996;77:370-373.
69. Pliam MB, **Shaw RE**, Zapolanski A,. Comparative analysis of coronary surgery risk stratification models. **The Journal of Invasive Cardiology** 1997;9:203-222.
70. Ellis SG, Weintraub W, Holmes D, **Shaw RE**, Block PC, King SB. Relation of operator volume and experience to procedural outcome of percutaneous coronary revascularization at hospitals with high interventional volumes. **Circulation** 1997;96:2479-2484.
71. Ryan C, **Shaw RE**, Murphy MC, O'Murchu B. Hypertension is a more frequent risk factor and associated with a higher mortality in women Undergoing interventional coronary procedures. In press **American Journal of Hypertension**
72. **Shaw RE**, Cuneo R. Goal assessment and resource planning in developing cardiac databases. **The Journal of Invasive Cardiology** 1999;11:694-699.
73. Ryan C, **Shaw RE**, Pliam MB, Zapolanski AJ, Murphy M, Valle HV, Myler RK. Coronary heart disease in the Filipino and Filipino-American patients: Prevalence of risk factors and outcomes of treatment. **The Journal of Invasive Cardiology** 2000;12:134-139.
74. Gavin LA, Barth J, Arnold D, **Shaw RE**. Troglitazone add-on to a combination of sulfonylureas plus metformin achieved and sustained effective diabetes control. In press **Endocrine Practice** 2000;6:305-310.
75. Millhouse FG, **Shaw RE**. A process for ensuring optimal cardiovascular intervention and identifying candidates for glycoprotein IIb/IIIa receptor inhibitor therapy. **American Journal of Cardiology** 2000;85:27B-31B.
76. Yap A, Baladi N, Allman G, Avenmarg J, Yap S, Shaw RE. Coronary Artery Bypass Surgery on Small Patients. **The Journal of Invasive Cardiology** 2000;12:242-246.
77. **Shaw RE**. The Power of Modern Computing and the Internet in the Delivery and Evaluation of Cardiac Care. **The Journal of Invasive Cardiology** 2001;13(5):425-426.
78. Zapolanski A, Korver K, Pliam MB, Mengarelli L, **Shaw RE**. Multiple coronary artery bypass via mini left thoracotomy with conventional aortic occlusion. **Heart Surgery Forum** 2001;4(2):109-112.
79. Zapolanski A, Korver K, Pliam M, Mengarelli L, **Shaw RE**. Left Main Coronary Artery Disease in Beating Heart Surgery. **Heart Surgery Forum** 2001;4(2):113-117.
80. Brindis RG, Fitzgerald S, Anderson HV, **Shaw RE**, Weintraub WS, Williams JF. The American College of Cardiology-National Cardiovascular Data Registry (ACC-NCDR): Building a national clinical data repository. **Journal of the American College of Cardiology** 2001;37(8):2240-2245.

CURRICULUM VITAE

Richard E. Shaw, M.A., Ph.D., F.A.C.C., F.A.C.A. 27

81. Cannon CP for the ACC Writing Committee for Acute Coronary Syndromes Clinical Data Standards and the ACC Task Force on Clinical Data Standards (**Shaw RE**). American College of Cardiology Key Data Elements and Definitions for Measuring the Clinical Management and Outcomes of Patients with Acute Coronary Syndromes. **Journal of the American College of Cardiology** 2001;38(7):2114-2130.
82. Anderson HV, **Shaw RE**, Brindis RG, Hewitt K, Krone RJ, Block PC, McKay CR, Weintraub WS on behalf of the ACC-NCDR. A contemporary overview of percutaneous coronary interventions: The American College of Cardiology-National Cardiovascular Data Registry. **Journal of the American College of Cardiology** 2002;39(7):1096-1103.
83. **Shaw RE**, Weintraub WS, Anderson HV, Brindis RG, Krone RJ, Klein LW, McKay CR, Block PC, Hewitt K on behalf of the ACC-NCDR. Development of a risk adjustment mortality model using the American College of Cardiology National Cardiovascular Data Registry (ACC-NCDR) experience: 1998-2000. **Journal of the American College of Cardiology** 2002;39(7):1104-1112.
84. Klein LW, Block P, McCallister BD, Wolk M, **Shaw RE**, Weintraub WS. Percutaneous Coronary Angioplasty in Octogenarians in the NCDR Database: risks associated with acute myocardial infarction. **Journal of the American College of Cardiology** 2002; 40(3):394-402.
85. Zapolanski A, Korver K, Plam MB, **Shaw RE**, Mengarelli LM. Mitral valve surgery via a right anterior mini-thoracotomy with central aortic cannulation and no endoscopic assistance. **Heart Surgery Forum** 2002; Suppl 4:S445-53.
- Krone RJ, **Shaw RE**, Klein LW, Block PC, Anderson HV, McKay CR, Brindis RG on behalf of the ACC-NCDR. Evaluation of the American College of Cardiology/American Heart Association and the Society for Coronary Angiography and Interventions lesion classification system in the current "stent era" of coronary interventions. **American Journal of Cardiology** 2003; 92:389-394.
87. **Shaw RE**, Anderson HV, Brindis RG, Krone RJ, Klein LW, McKay CR, Block PC, Shaw LJ, Hewitt K, Weintraub WS on behalf of the ACC-NCDR. Updated risk adjustment mortality model using the complete 1.1 dataset from the American College of Cardiology Data Registry (ACC-NCDR). **The Journal of Invasive Cardiology** 2003;15:578-580.
88. Ryan C, **Shaw RE**, Millhouse FG, Zapolanski A, Yap A, Lee L, Khoury L, Cavanaugh M, Plam MB. The role of ethnicity in outcomes after coronary artery intervention: how important are clusters of risk factors? **The Journal of Angiology** 2004;1(3):283-291.
89. Tavis DR, Gallauresi B, Lin B, Rich SE, **Shaw RE**, Weintraub WS, Brindis RG, Hewitt K. Risk of local adverse events following cardiac catheterization by hemostasis device use and gender. **The Journal of Invasive Cardiology** 2004;16:459-464.
90. Sherev DA, **Shaw RE**, Brent BN. Angiographic predictors of life-threatening femoral access site complications: Implications for planned percutaneous coronary intervention. **Catheterization and Cardiovascular Intervention** 2005;65:196-202.
91. Tavis DR, Dey S, Albrecht-Gallauresi B, Brindis RG, **Shaw RE**, Weintraub WS, Mitchell K. Risk of local adverse events following cardiac catheterization by hemostasis device use – Part II. **The Journal of Invasive Cardiology** 2005;17:644-650.

CURRICULUM VITAE

Richard E. Shaw, M.A., Ph.D., F.A.C.C., F.A.C.A. 28

92. Klein LW, **Shaw RE**, Krone RJ, Brindis RG, Anderson HV, Block PC, McKay CR, Hewitt K, Weintraub WS. Mortality after emergent percutaneous coronary intervention in cardiogenic Shock: A predictive model based on 483 consecutive patients in the ACC-NCDR Registry. **The American Journal of Cardiology**, 2005;96:35-41.
93. Anderson HV, **Shaw RE**, Brindis RG, Klein LW, McKay CR, Kutcher MA, Krone RJ, Wolk MJ, Smith SC, Weintraub WS. Relationship Between Procedure Indications and Outcomes of Percutaneous Coronary Interventions By American College of Cardiology/American Heart Association Task Force Guidelines. **Circulation** 2005;112:2786-2791.
94. Yap A, Baladi N, Zapolanski A, Pliam MB, **Shaw RE**. Influence of body size on outcomes of off-pump coronary artery bypass surgery. **Heart Surgery Forum** 2005;8(3):E190-5.
95. Rao SV, **Shaw RE**, Brindis RG, Klein LW, Weintraub WS, Krone RJ, Weintraub WS. Patterns and outcomes of drug-eluting stent use in clinical practice. **The American Journal of Cardiology** 2006; June 30 (on line).
96. Rao SV, **Shaw RE**, Brindis RG, Klein LW, Weintraub WS, Weintraub WS. On versus off label use of drug-eluting coronary stents: A report from the American College of Cardiology National Cardiovascular Data Registry. **The American Journal of Cardiology** 2006; 97(10): 1478-81.
97. Krone RJ, **Shaw RE**, Klein LW, Blankenship JC, Weintraub WS. Ad hoc coronary intervention in patients with stable coronary artery disease - a study of the prevalence, safety and variation in use from the American College of Cardiology National Cardiovascular Data Registry (ACC-NCDR). **Catheterization and Cardiovascular Intervention** 2006;68:696-703.
98. Strunk BS, **Shaw RE**, Bull S, Adams J, Baer M, Gershengorn K, Kao A, Keeffe B, Sklar J, Sperling D, Sperling R, Wexman M, Young J. High incidence of focal left ventricular wall motion abnormalities and normal coronary arteries in patients with myocardial infarctions presenting to a community hospital. **The Journal of Invasive Cardiology** 2006; 18(8):376-81.
99. Huang HW, Brent BN, **Shaw RE**. Trends in percutaneous versus surgical revascularization of unprotected left main coronary stenosis in the drug-eluting stent era - A report from the American College of Cardiology National Cardiovascular Data Registry (ACC-NCDR). **Catheterization and Cardiovascular Intervention** 2006; 68:867-872.
100. Anderson HV, **Shaw RE**, Brindis RG, McKay CR, Klein LW, Krone RJ, Ho, KK, Rumsfeld JS, Smith SC, Weintraub WS. Risk-Adjusted mortality analysis of percutaneous coronary interventions by American College of Cardiology/American Heart Association Guidelines Recommendations. **The American Journal of Cardiology** 2007; 99(2): 189-96.
101. Dehmer GJ, Kutcher MA, Dey SK, **Shaw RE**, Weintraub WS, Mitchell K, Brindis RG. Frequency of percutaneous coronary interventions at facilities without on-site cardiac surgical backup - a report from the American College of Cardiology National Cardiovascular Data Registry. **American Journal of Cardiology** 2007; 99(3): 329-32.

CURRICULUM VITAE

Richard E. Shaw, M.A., Ph.D., F.A.C.C., F.A.C.A. 29

102. Mehta SK, Frutkin AD, Milford-Beland S, Klein LW, **Shaw RE**, Weintraub WS, Krone RJ, Anderson HV, Kutcher MA, Marso SP. The Utilization of Distal Embolic Protection in Saphenous Vein graft interventions: An Analysis of 19,546 patients in the ACC-NCDR. **The American Journal of Cardiology** 2007 (in press).
103. Levy MT, Baumgarten A, Hui PYM, **Shaw RE**. Have the recommendations of the Third Report of the National Cholesterol Education Program (NCEP) expert panel on detection, evaluation and treatment of high blood cholesterol in adults (ATP III) been effectively implemented? A report from the ACC National Cardiovascular Data Registry. **Journal of the American Medical Association** 2007 (submitted).
104. Patel AD, **Shaw RE**, Khan BV, Helmy T. Race and gender differences in post-procedural outcomes following percutaneous coronary interventions in African Americans and Caucasians. **The Journal of the American College of Cardiology**, 2007 (submitted).
105. Patel AD, **Shaw RE**, Khan BV, Helmy T. Post-procedural outcomes in Hispanics, Asians, American Indians and Caucasians following percutaneous coronary intervention. **The Journal of the American College of Cardiology**, 2007 (submitted).

CURRICULUM VITAE

Richard E. Shaw, M.A., Ph.D., F.A.C.C., F.A.C.A. 30

BOOK CHAPTERS

1. **Shaw RE.** The problem of recurrent stenosis following successful coronary angioplasty. In Clark DA (ed.) **Coronary Angioplasty** New York: Alan R. Liss, 1987.
2. **Shaw RE.** Cohen F, Doyle B, Palesky J. The impact of denial and repressive style on information gain and rehabilitation outcomes in myocardial infarction patients. In Steptoe A, Wardle J (eds) **Psychosocial Processes and Health: A Reader**. London: Cambridge University Press, 1991.
3. **Schechtmann NS, Rosenblum J, Shaw RE, Myler RK, Stertz SH.** Angioplasty of the completely occluded coronary vessel. In Braverman M (ed) **Surgical Technology International**. London: Century Press, 1991, pp 191-195.
4. **Raju PK, Stertz SH, Shaw RE, Pomerantsev E, Zipkin R, Murphy M, Myler RK.** High Speed Rotational Atherectomy in Coronary Disease. In Braverman M (ed) **Surgical Technology International II**. Shiny International LTD: Hong Kong, 1993, pp 255-258.
5. **Myler RK, Shaw RE, Rosenblum J, Stertz SH, Zipkin RE, Hecht HS, Cumberland DC, Ryan C, Zapolanski A.** Complex Coronary Angioplasty. In Pepine C (ed) **Diagnostic and Therapeutic Cardiac Catheterization, 2nd Edition**. Baltimore: Williams and Wilkins, 1994, pp 494-525.
6. **Myler RK, Shaw RE, Ryan C, Dunlap R.** Coronary angioplasty: balloons and new devices. Coronary angioplasty and coronary artery bypass surgery. In Braverman M (ed) **Surgical Technology 1995 - International Developments in Surgery and Surgical Research**. Shiny International LTD: Hong Kong, 1995.

INVITED PUBLICATIONS

1. **Shaw RE.** Is coronary treatment a greater risk for women? Recent study clarifies numerous gender-specific risk factors. **Heartbeat: A bulletin from the San Francisco Heart Institute at Seton Medical Center.** 1993(summer); vol. 2, no. 2.
2. **Shaw RE.** Developing risk profiles for coronary angioplasty. First step toward long-term predictor. **Heartbeat: A bulletin from the San Francisco Heart Institute at Seton Medical Center.** 1994(spring); vol. 3, no. 1.
3. **Shaw RE.** Development of a "Mobile Web" for Healthcare Data Collection using Tablet-PC and Mi-Forms Technology. **Health Care Technology: The Digital Healthcare System 2006** (vol. 4) pp133-135.

CURRICULUM VITAE

Richard E. Shaw, M.A., Ph.D., F.A.C.C., F.A.C.A. 31

PRESENTATIONS, INVITED LECTURES, SYMPOSIA

1. The Impact of Denial on the Rehabilitation of Heart Attack Patients. Paper presented at the American Psychological Association National Convention, Anaheim, CA, 1983.
2. Rehabilitating the Heart Patient. Presentation given to the Northern California Chapter of Cardiac Rehabilitation Specialists, San Francisco, CA, 1984.
3. The Role of Psychological and Information Factors in Rehabilitating the Heart Attack Patient. Invited speaker, Cardiology Grand Rounds, Pacific Medical Center, San Francisco, CA, 1984.
4. The Effect of Mismatch Between Repressive Style and information Gain on Rehabilitation Outcomes in Myocardial Infarction Patients. Paper presented at the American Psychological Association National Convention, Toronto, Canada, 1984.
5. The Role of Psychological Factors in the Treatment of Cardiac Patients. Invited speaker, Heart to Heart Program, San Francisco Chapter of the American Heart Association, 1985.
6. Clinical and Morphologic Factors in Prediction of Restenosis after Multiple Vessel Angioplasty. Paper presented at the American College of Cardiology Annual Scientific Sessions, Atlanta, Georgia, 1986.
7. The Role of Psychological Factors in the Education and Treatment of Cardiac Patients. Invited speaker, "Angina: Innovations in care" 1986 Nursing Symposium sponsored by the American Heart Association, San Mateo Chapter, 1986.
8. Effect of Coping and Knowledge on Restenosis and Late Complications after Angioplasty (PTCA). Paper presented at the X World Congress of Cardiology, Washington DC, 1986.
9. Factors Predicting Restenosis and Late Complications Following Coronary Angioplasty. Paper presented at the American Heart Association Annual Scientific Sessions, Dallas, Texas, 1986.
10. Acute complications following coronary angioplasty of totally occluded vessels. Paper presented at the American Heart Association Annual Scientific Sessions, Anaheim, California, 1987.
11. Is incomplete revascularization more important than lesion morphology in the incidence of late events after angioplasty? Paper presented at the American Heart Association Annual Scientific Sessions, New Orleans, Louisiana, 1989.
12. Are coronary angioplasty and coronary bypass patients different in psychological and health perceptions? Paper presented at the American College of Cardiology Annual Scientific Sessions, New Orleans, 1990.
13. The research process - from hypothesis to publication. Cardiology Grand Rounds, University of California San Francisco, School of Medicine, 1990.
14. Symposium Chair and organizer - First Annual Symposium on Invasive Cardiology in the 1990's: Clinical trials, new devices and the proliferation of data - where we were, where we are, and where we're going, Kauai, Hawaii, March 24-27, 1991.

CURRICULUM VITAE

Richard E. Shaw, M.A., Ph.D., F.A.C.C., F.A.C.A. 32

15. Symposium organizer - Spring Symposium Series on Cardiovascular Advances, San Francisco, California, March-April, 1991-1992.
16. Symposium Chair and organizer - Second Annual Symposium on Invasive Cardiology in the 1990's: From Research to Reality: Translating Results into Clinical Practice, Amelia Island, Florida, September 23-26, 1992.
17. Symposium organizer - Second Annual Symposium Series on the Diagnosis and Treatment of Cardiovascular Disease, San Francisco, California, September-April, 1992-1993.
18. ACCEL (American College of Cardiology Educational Library) Tape Series: Women versus Men Undergoing Coronary Angioplasty or Bypass Surgery: A Five Year Study. 1993 ACCEL series.
19. Comparison of Women Undergoing Multiple Vessel Revascularization with Coronary Bypass Surgery or Balloon Angioplasty: A Five-Year Study. Paper presented at the American College of Cardiology 42nd Annual Scientific Sessions, Anaheim, California, 1993.
20. Symposium Co-chair (with Richard K. Myler, M.D. and Robert M., Califf, M.D.) - Third Annual Symposium on Invasive Cardiology in the 1990's: Atherogenesis, Thrombosis and Restenosis - Challenges for Intervention, Monterey, California, September 26-29, 1993.
21. PTCA: Success and Complications. Cardiology Grand Rounds, California Pacific Medical Center, San Francisco, California, 1993.
22. Symposium organizer - Third Annual Symposium Series on the Diagnosis and Treatment of Cardiovascular Disease, San Francisco, California, September-April, 1993-1994.
23. Utility of the Framingham Risk Factor Profile in Predicting Late Events after Coronary Angioplasty. Paper presented at the American College of Cardiology 43rd Annual Scientific Sessions, Atlanta, Georgia, 1994.
24. Symposium organizer - Fourth Annual Symposium Series on the Diagnosis and Treatment of Cardiovascular Disease, San Francisco, California, September-April, 1994-1995.
25. Co-moderator (with Dean Kereiakes, M.D.) for symposium and editor of a special issue of **The Journal of Invasive Cardiology** on the meeting titled "Improving outcomes in patients at higher risk of ischemic complications during and after PTCA", Amelia Island, Florida, 1994.
26. Invited speaker for the 1994 International SIR Users Group Meeting, presenting 2 papers, "Issues in the collection and analysis of longitudinal cardiac treatment data" and "The development of an integrated database system for management of cardiac data", London, England, 1994.
27. Co-chair (with Dean Kereiakes, M.D.) and presenter, Evening Symposium titled "Perfusion Balloon Angioplasty" at the Transcatheter Cardiovascular Therapeutics - VII, Seventh Annual Symposium; presentation titled "Inflation Duration: Changing Strategies", February 22, 1995, Washington, D.C.
28. Chair, Session on Interventional Cardiology, 3rd International Congress on Heart Failure - Mechanisms and Treatment, May 21-25, 1995, Geneva, Switzerland.

CURRICULUM VITAE

Richard E. Shaw, M.A., Ph.D., F.A.C.C., F.A.C.A. 33

29. Invited speaker for the Daughter's of Charity National Healthcare System First National Cardiac Education Meeting, held June 8-9, 1995, Indiana Heart Institute, Indianapolis, Indiana
30. Co-Moderator (with Michael Lincoff, M.D.), organizer, and editor of a special issue of **The Journal of Invasive Cardiology** on the meeting "Evolution of the Clinical Applications of ReoPro", July 21-23, 1995, Amelia Island, Florida
31. Symposium participant, presentation titled "Perfusion Balloon Angioplasty: Comparison to Other Interventional Devices", at the Perfusion Balloon Strategies Symposium, Sequoia Hospital Annual Interventional Meeting, October 12, 1995, San Francisco, California
32. Invited speaker for the Daughter's of Charity National Healthcare System Second Annual National Cardiac Education Meeting, held October 21-22, 1996 at St. Thomas Hospital, Nashville, Tennessee
33. Symposium Moderator for "A Symposium on Platelet IIb/IIIa Receptor Inhibition in Interventional Cardiology" held in conjunction with the course New Horizons in Cardiovascular Intervention, May 4-7, 1997, San Francisco, California
34. Invited speaker for the Daughter's of Charity National Healthcare System Third Annual National Cardiac Education Meeting, held October 12-14, 1997 at the San Francisco Heart Institute Seton Medical Center, Daly City, California
35. Symposium participant, presentation titled "Identifying Your Data Reporting Needs", at the American College of Cardiology special session "How to Collect and Use Clinical Data to Enhance Quality Patient Care" sponsored by the ACC Database Committee and held in conjunction with the ACC Annual Scientific Meeting, March 28, 1998, Atlanta, Georgia
36. Invited speaker for the 1998 International SIR Users Conference, presented paper titled "Forces Driving the Development of Cardiac Databases", April 20-22, 1998, Orlando, Florida
37. Invited speaker for the Third Annual Clinical Quality Physician Education Series, Information Systems and Clinical Process Improvement, lecture titled "Identifying Data Reporting Needs: Challenges and Solutions", sponsored by SSM Healthcare, November 5, St. Louis, Missouri
38. Symposium participant, presentation titled "Cardiac Data Uses and Reporting", at the American College of Cardiology special session "Supporting Quality Patient Care with Clinical Data" sponsored by the ACC Database Committee and held in conjunction with the ACC Annual Scientific Meeting, March 7, 1999, New Orleans, Louisiana
39. Symposium participant, presentation titled "Assessing Database Goals and Resources", at the American College of Cardiology special session "Supporting Quality Patient Care with Clinical Data" sponsored by the ACC Database Committee and held in conjunction with the ACC Annual Scientific Meeting, March 7, 1999, New Orleans, Louisiana
40. Invited lecture, "Getting your point across: understanding the basics of data analysis and presentation" sponsored by the Seton Medical Center CME Committee and the Performance Improvement Department, May 11, 1999, Seton Medical Center, Daly City, California

CURRICULUM VITAE

Richard E. Shaw, M.A., Ph.D., F.A.C.C., F.A.C.A. 34

41. Moderator for symposium titled "Hot Topics in Vascular Intervention: A Point/Counterpoint Discussion" sponsored by Medtronic AVE and held in conjunction with TCT XI, September 23, 1999, Washington, D.C.
42. Moderator for symposium titled "Angio-Seal Town Meeting: Current and Future Clinical Insights" sponsored by Daig and held in conjunction with TCT XI, September 24, 1999, Washington, D.C.
43. Invited speaker for Medical Rounds, California Pacific Medical Center, lecture titled "Changing Patterns of GPIIb/IIIa Inhibitor Use: Effects on Short Term Clinical Outcomes and Cost", October 22nd, 1999, San Francisco, California.
44. Invited speaker for the Second Annual Heartbase Users Meeting, lecture titled "Making the Most of Your Cardiac Database", October 28th and 29th, 1999, Chicago, Illinois.
45. Invited speaker for The Acute Coronary Syndromes Meeting sponsored by Genentech and Catholic HealthCare West, Northern California, lecture titled "Use of the NRM1 registry as a Quality Improvement Process", October 30th, 1999, Westin Hotel, San Francisco International Airport, Millbrae, California.
46. Invited speaker, Medical Rounds at the University of Arizona School of Medicine, lecture titled "Changing Patterns of GPIIb/IIIa Inhibitor Use: Effects on Short Term Clinical Outcomes and Cost", November 1st, 1999, University of Arizona, Tucson, Arizona.
47. Invited speaker for The Acute Coronary Syndromes Meeting sponsored by Genentech and Catholic HealthCare West, Southern California, lecture titled "Impact of Changing Patterns of IIb/IIIa Inhibitor Use on Outcomes and Cost: The Seton Medical Center Experience", November 12th and 13th, 1999, Hyatt Regency Hotel, Long Beach, California.
48. Presenter at the ACC-NCDR Users Group Meeting held in conjunction with the 49th Annual Scientific Sessions of the American College of Cardiology, talk titled "ACC/NCDR Preliminary Data", March 11, 2000, Anaheim, California.
49. Presenter at the ACC-NCDR Users Group Meeting held in conjunction with the 49th Annual Scientific Sessions of the American College of Cardiology, talk titled "Interpreting ACC/NCDR Reports (Quality and Institutional)", March 11, 2000, Anaheim, California.
50. Presenter at the scientific session "ACC National Cardiovascular Data Registry and STS Database Programs Working to Improve Patient Care" held at the 49th Annual Scientific Sessions of the American College of Cardiology, talk titled "ACC National Cardiovascular Data Registry – Preliminary Data", March 14, 2000, Anaheim, California.
51. Presenter at the International Andreas Gruentzig Society Biennial Meeting, talk titled "The Power of Modern Computing and the Internet in the Delivery and Evaluation of Cardiac Care", May 28 – June 1, 2000, Crete.
52. Presenter, Webinar titled "Improving Patient Care through Better Analytics and Reporting" sponsored by SPSS Inc., Chicago, Illinois – International web-based program presented on March 1, 2001, attended by over 175 participants worldwide.
53. Presenter at Medical Grand Rounds, talk titled "Improving the Quality of Care for Cardiac Patients While Controlling Costs", March 2, 2001, Blanchard Valley Regional Health System, Findlay, Ohio.

CURRICULUM VITAE

Richard E. Shaw, M.A., Ph.D., F.A.C.C., F.A.C.A. 35

54. Presenter at the ACC-NCDR 2nd Annual User Group Meeting: Improving Patient Care with Quality Data, talk titled "Risk Adjustment Methodology and Interpretation: What Does It All Mean?", March 17, 2001, Orlando, Florida.
55. Presenter at the Special Report: Clinical Outcomes from the ACC-NCDR talk titled "Risk Adjustment for PCI Patients", held in conjunction with the American College of Cardiology 50th Annual Scientific Sessions, March 20, 2001, Orlando, Florida.
56. Presenter, Webinar titled "Improving Patient Care through Better Analytics and Reporting" sponsored by SPSS Inc., Chicago, Illinois – International web-based program re-presented on May 10, 2001, attended by over 100 participants worldwide.
57. Keynote Speaker, talk titled "Understanding Risk Adjustment Methodology and Its Application to Cardiovascular Medicine", HeartBase Annual Users Conference 2001, September 26-28, 2001, Chicago, Illinois.
58. Co-Chair with David J. Cohen – ACC Session "Modeling Outcomes and Cost", oral presentation session at the American College of Cardiology 51st Annual Scientific Session, March 18, 2002, Atlanta, Georgia.
59. Presenter at the ACC-NCDR 4th Annual User Group Meeting: Improving the Quality of Care for Cardiac Patients, talk titled "What's New in the NCDR Version 3.0 Dataset", March 28, 2003, Chicago, Illinois.
60. Presented 2 lectures, "Introduction to Cath Lab Module v3.0 101" and "ACC-NCDR: Risk Adjustment and Benchmarking for Quality Improvement" at the workshop The Future of Invasive Cardiology Performance Measurement: ACC-NCDR Workshop, held on October 11-12, at La Jolla, California and November 6-7, at Hollywood, Florida.
61. Presented 3 talks at the ACC-NCDR 5th Annual User Group Quality Conference. Talk 1 "Cath Lab Module v3.0 Questions and Answers", Talk 2 "When Your Data Comes Back to Haunt You: Key Ingredients to Data Cleaning", Talk 3 "Public Reporting: Quality is No Secret", March 5th and 6th, 2004, New Orleans, Louisiana.
62. Presenter at the AHA/ACC 5th Scientific Forum on Quality of Care and Outcomes Research in Cardiovascular Disease and Stroke. Talk titled: Outcomes Research Using National Databases and Existing Trials: The ACC-NCDR Database, May 14-17, 2004, Washington D.C.
63. Presented lecture titled "Understanding Risk Adjustment and its Relationship to Benchmarking, Quality Improvement and Care of the Cardiac Patient" at the ACC-NCDR Version 3.0 workshops held in La Jolla, California. September 23-24, 2004 and Washington D.C. on October 14-15, 2004.
64. Presented 2 talks at the ACC-NCDR 6th Annual User Group Quality Conference. Talk 1 "V3.04 Data Quality and Institutional Report Interpretation", Talk 2 "No Skipping Reliability and Integrity: The Challenge of Maintaining Clean Data", March 4th and 5th, 2005, Orlando, Florida.
65. Presented at the ACC-NCDR 7th Annual User Group Quality Conference. Talk titled "ACC-NCDR Reports for the CathPCI and ICD Registries", March 10, 2006, Atlanta, Georgia.
66. Presented at the 2006 Mi0Co Users Meeting, talk titled "CRUSADE data collection project using the Tablet-PC and Mi-Forms software". April 25th, 2006, Durham, North Carolina.

CURRICULUM VITAE

Richard E. Shaw, M.A., Ph.D., F.A.C.C., F.A.C.A. 36

67. Presentation titled "Understanding current approaches to risk-adjustment of clinical outcomes in cardiac surgery". Department of Cardiovascular and Thoracic Surgery Grand Rounds, May 5th, 2006, California Pacific Medical Center, San Francisco, California.
68. Presentation titled "Risk-adjustment Methodologies in Cardiology and Cardiac Surgery and the Use of Data in Public Reporting". Department of Medicine and Cardiac Surgery Grand Rounds, June 26th, 2006, The Valley Hospital, Ridgewood, New Jersey.
69. Keynote address at the HIMSS Health Care Solutions Summit 2006, presentation titled "Development of a Mobile Web for Healthcare Data Collection Using Tablet-PC and E-Forms Technology" October 19, 2006, La Jolla, California.
70. Presentation titled "CMS.gov: JCAHO Core Measures and AHA/ACC Guidelines", St. Luke's second annual symposium on the diagnosis and treatment of heart failure. February 24, 2007, San Francisco, California.

Revised 4/15/2007

EXHIBIT B

**Analysis of Mortality and Selected Complications for Cardiac Surgeries
Performed by Coyness Ennix, M.D. Compared to Non-Kaiser Surgeons at
Summit Medical Center**

**Richard E. Shaw, M.A., Ph.D., F.A.C.C., F.A.C.A.
August 30, 2005**

I was asked by Dr. Coyness Ennix to provide an analysis to compare his cardiac surgical results with those of Non-Kaiser Surgeons performing procedures at Summit Medical Center and to comment on analyses that were performed at his request by Dr. Howard Barkan. All of the data used for these analyses were provided to me by Dr. Ennix and contained his specific results and aggregate results for the other Summit Medical Center cardiac surgeons.

There are 4 points related to comparing surgical results that I would ask the committee to consider before reviewing this report:

- 1) It is extremely difficult, if not impossible, to compare cardiac surgeons by examining their overall surgical experience. The mortality and complications of isolated CABG surgical procedures vary substantially from those involving isolated valve replacement or repair, or combinations surgeries involving CABG and valve procedures. The valve and combination procedures carry a much higher risk. This is why the Society of Thoracic Surgeons (STS) national data registry reports the results for these types of surgeries separately. Since CABG surgery is the most commonly performed cardiac surgery, it is often used by itself to assess the outcomes of a program or an individual surgeon. This is why the State of California has chosen to evaluate cardiac surgical performance of institutions and surgeons based on their results in isolated CABG.
- 2) Any comparisons that involve rates are subject to instability with small sample sizes. The occurrence of 1 event in 25 cases versus 1 event in 100 cases produces vastly different rates. This issue is important in comparing results between institutions, and is extremely critical when comparing rates between surgeons. There are 2 approaches to minimize the effect of small sample sizes: 1) use confidence intervals when comparing rates; and 2) pooling results across longer time periods. In Dr. Barkan's report and mine, we have both tried to incorporate the use of confidence intervals where possible and pooled results across broader time periods. As a point of reference, the California state project for tracking performance for CABG surgery (CCORP) has proposed pooling individual surgeon data across 3 years before comparisons are made.
- 3) It is misleading and inaccurate to compare the outcome of any medical or surgical intervention without including risk adjustment. Extensive work has been done in cardiac surgery to develop risk models for mortality and selected complications (return to the OR, deep sternal wound infection, permanent stroke, prolonged ventilation and renal failure). Risk adjustment must be incorporated into any

legitimate comparison between institutions or surgeons to draw accurate conclusions.

- 4) With advances in drug-eluting stent technology and other percutaneous catheter techniques, the complexity of cases presenting for cardiac surgery has increased dramatically over the last 2 years, and the volume of patients referred for cardiac surgery has decreased significantly. These trends are going to continue and have an impact on surgical outcomes, placing even more demand on those evaluating surgical outcomes to take these trends into account.

Comment on Dr. Barkan's analyses

At the request of Dr. Ennix, I have reviewed the analyses done by Dr. Howard Barkan. His analyses are statistically accurate and incorporate appropriate confidence intervals and expected mortality risk. Based on these analyses, his conclusion that there is no statistically significant difference between mortality outcomes between Dr. Ennix and the non-Kaiser Surgeons operating at Summit Medical Center is valid.

Current report

Analysis of Mortality

In the current report, I have incorporated a technique that I have developed for the reporting system that is used by the American College of Cardiology for institutions participating in the National Cardiovascular Data Registry. In this approach, the ratio of the observed mortality (O) to expected (E) is calculated, dividing O by E (O/E). This ratio provides a calibration that can be applied to normalize data and allow comparisons that take risk adjustment into consideration. If the observed mortality is equal to the expected mortality the O/E ratio is equal = 1.0. If the observed mortality is greater than the expected mortality, the O/E ratio is greater than 1.0. This implies that the results are not as good as the model generating the expected values would expect. If the observed mortality is less than the expected mortality, then the O/E ratio will be less than 1.0, suggesting that the observed results are better than expected. It is rare that this ratio is exactly equal to 1.0, and most often it will vary within a range to one side or the other. This calculation has confidence intervals, which allows one to compare to results and determine if they are significantly different. If the confidence intervals overlap between 2 calculations, then the conclusion is drawn that these are not statistically different. The O/E ratio can be used to normalize results by taking the overall observed mortality for a time period and multiplying the O/E ratio by this to get an adjusted mortality. Figure 1 displays O/E ratio for Dr. Ennix and the Non-Kaiser surgeons and the adjusted mortality for the years 2000 through the first quarter of 2005 in CABG only surgeries. Note that the O/E ratios cross back and forth around the line representing 1.0, and the adjusted mortality lines cross as well. Although not displayed here, the confidence intervals around these calculations overlap, indicating that there is no statistically significant difference between Dr. Ennix and the other surgeons. It is also noteworthy that when this risk adjustment is incorporated, there is no real trend towards better or worse results over

time. Figure 2 displays these same data aggregated into 3-year groupings and the overall experience. This demonstrates that the O/E ratio for Dr. Ennix has gone down slightly in recent years, while the O/E ratio of the other non-Kaiser surgeons is similar across the time periods. The confidence level bars are included in the display of the overall experience, and as is evident, they overlap, indicating that adjusted mortality is not significantly different. Although done using a different methodology than Dr. Barkan, these analyses are consistent and arrive at the same conclusion of no significant difference in mortality outcome comparing Dr. Ennix and the non-Kaiser surgeons. The results for non-CABG and combination procedures are not displayed here, but the volume of these procedures is so low for both the experience of Dr. Ennix and the non-Kaiser surgeons that the results are driven even more by small sample size and wide confidence intervals.

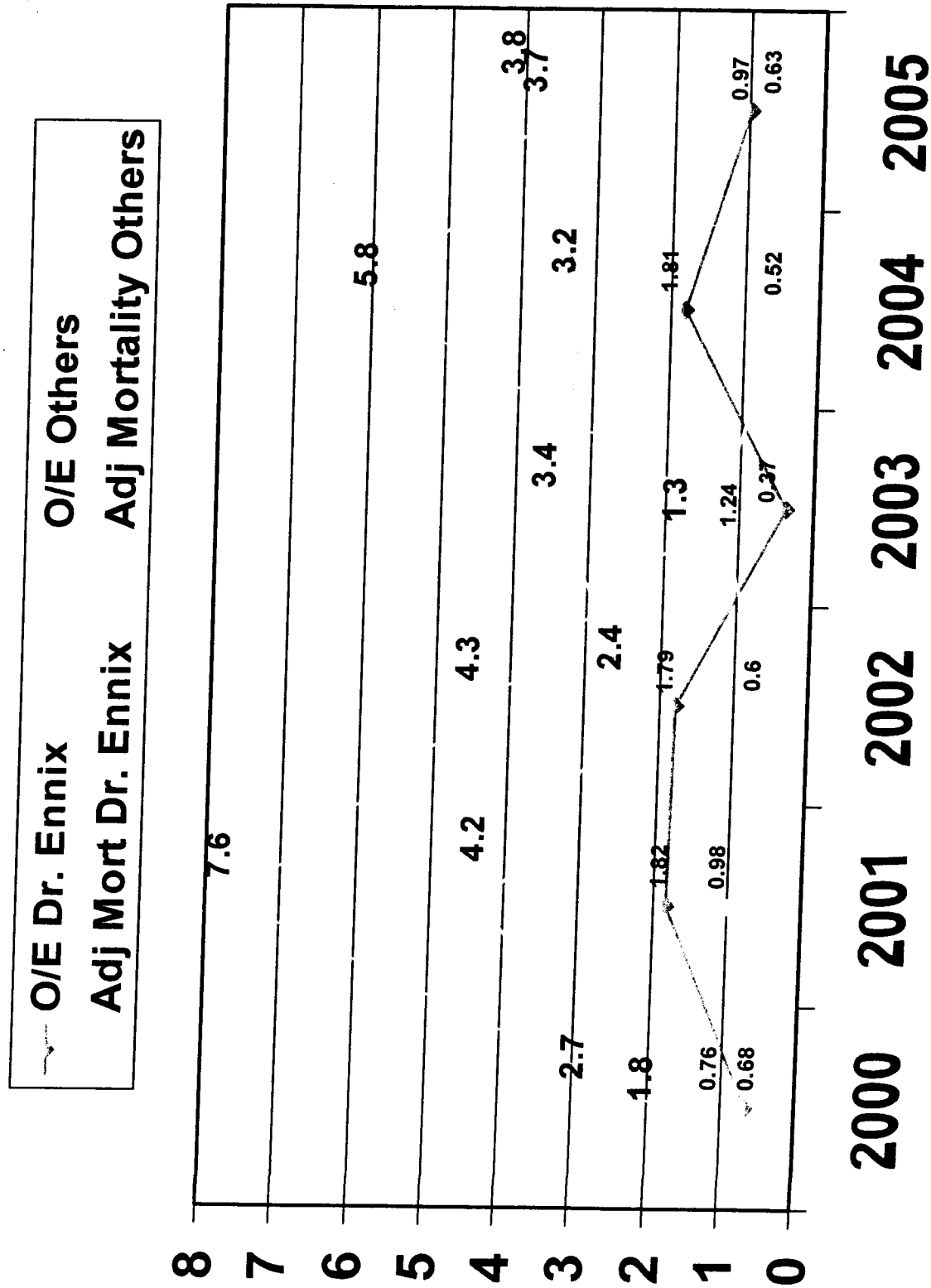
Analysis of post-surgical complications

Data reports provided to me did include rates by year for selected complications (return to the OR for any reason and sternal wound infections) for Dr. Ennix and the non-Kaiser surgeons performing surgery at Summit Medical Center. These reports did not include any breakdown of complication by type of surgery (i.e., CABG vs. Valve vs. CABG-Valve combination) or any of the risk adjusted calculations that are available to participants through the STS national database. I was provided with risk adjusted complications from STS for the entire medical center, but it was not broken down by surgeon. Therefore, any conclusions drawn from analyses done on these complications is very limited and can only be done in a valid way with STS risk adjusted complication data by surgeon broken down by type of surgery. Given these limitations, I have provided a display of 2 complications (unadjusted rate for return to the OR for any reason and sternal wound infection) by year to demonstrate that these unadjusted rates do fall into the range of complication rates reported by STS. Figure 3 displays the rate by year starting in 2002 of return to the OR for any reason for all cardiac surgeries performed by Dr. Ennix and the non-Kaiser surgeons. These unadjusted rates all fall within the range of rates that were reported by the STS for the 2004 national data for various types of cardiac surgery. Figure 4 presents similar data for sternal wound infection. These analyses only demonstrate that Dr. Ennix and the non-Kaiser surgeons appear to be within the ranges of what is being reported nationally by STS. No valid comparisons between Dr. Ennix and the non-Kaiser surgeons can be made without access to data that are risk adjusted by surgeon and of surgery.

Summary

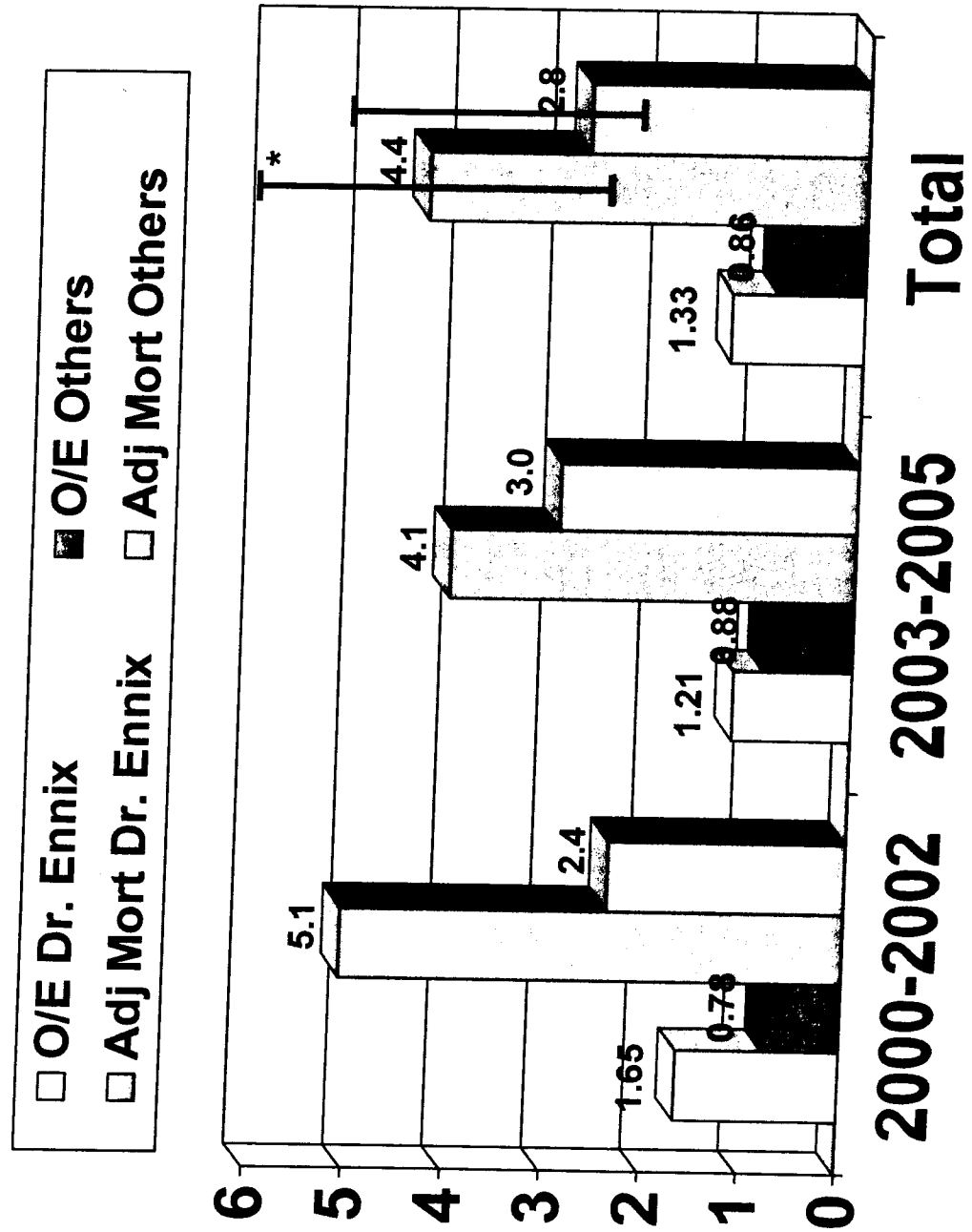
These analyses indicate that the cardiac surgical performance of Dr. Ennix, as assessed by risk adjusted mortality methods, is not significantly different than the mortality outcomes of the non-Kaiser cardiac surgeons operating at Summit Medical Center. There appears to be no trend for better or worse results over time when risk adjustment techniques are utilized. No definitive statement can be made about complications without the use of risk adjusted data by surgeon and type of surgery.

Comparison of Observed versus Expected (O/E) Mortality Ratio and Adjusted Mortality (O/E X Overall Mortality) by Year* for Dr. Ennix and Other Surgeons (Figure 1)

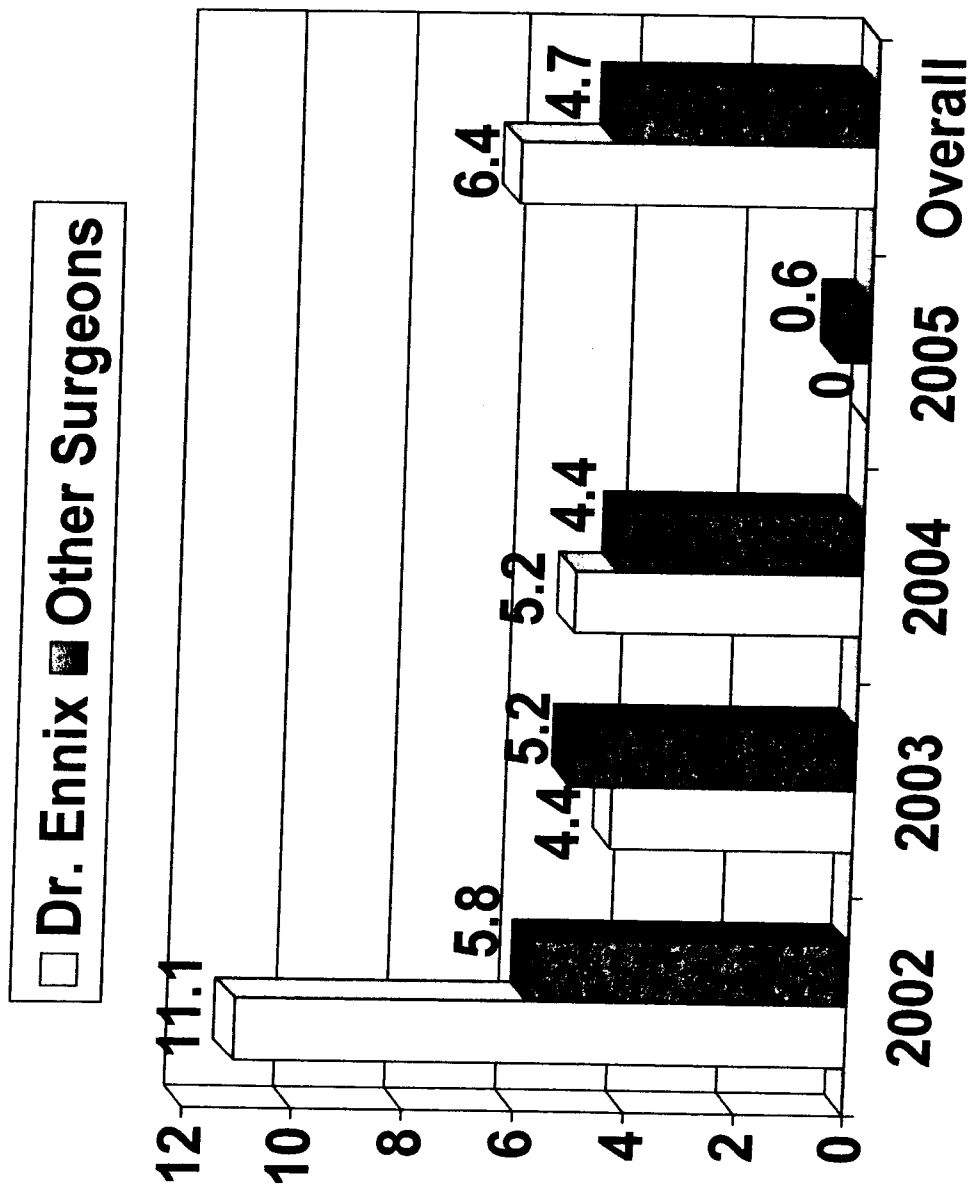


* Note that 95% confidence intervals for Dr. Ennix and other surgeons overlap every year, indicating no statistical difference

Comparison of Observed versus Expected Mortality (O/E) and Adjusted Mortality (O/E X Observed Mortality) for Dr. Ennix and Other Surgeons Combining 3-year Segments and Overall Experience (Figure 2)



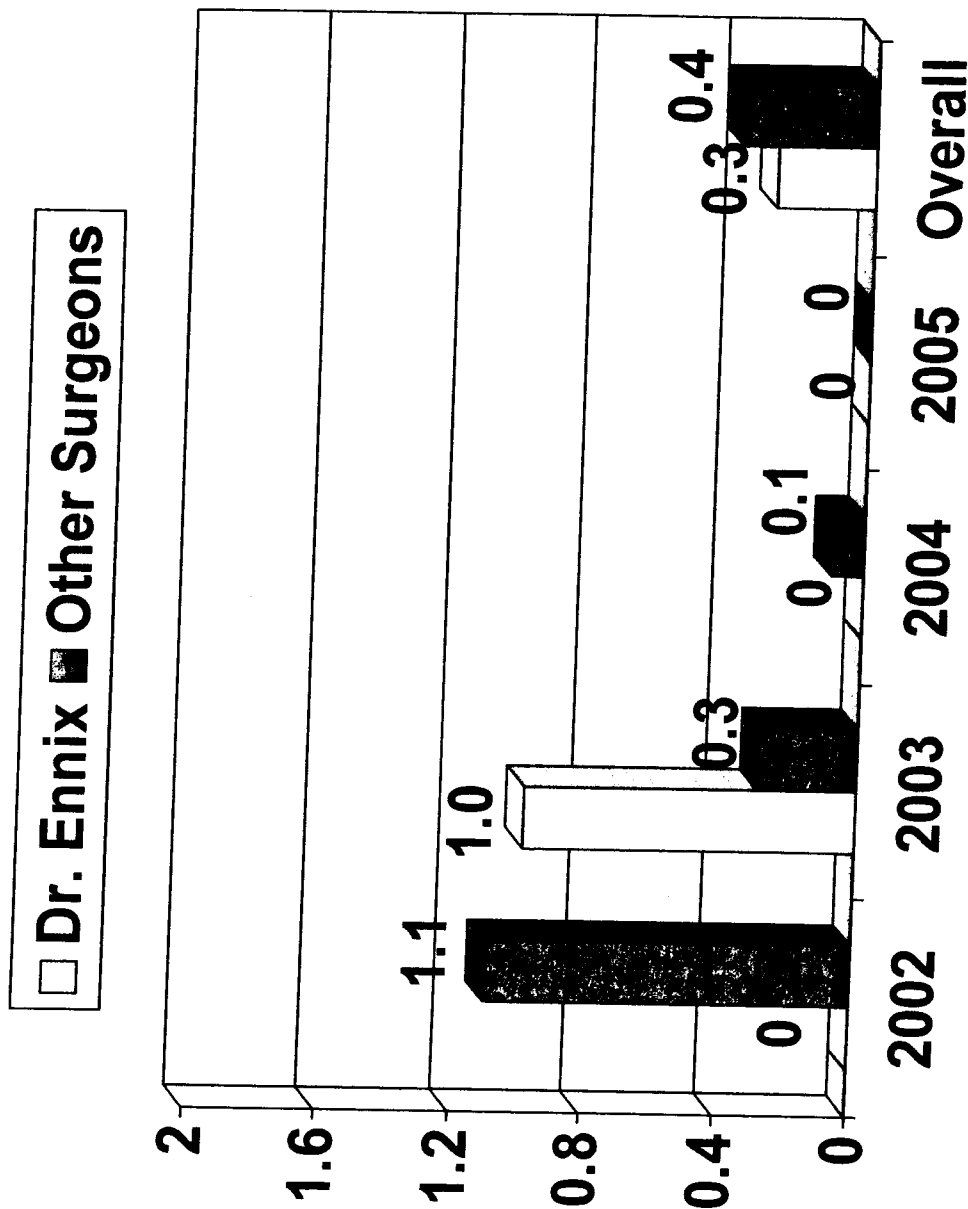
Return to OR in All Cardiac Surgeries for Dr. Ennix and Other Surgeons



STS 2004 Statistics for Return to OR:

- CABG only = 5.3%
- Isolated Valve = 7.9%
- CABG + Valve = 10.6%

Rate of Sternal Wound Infection in All Cardiac Surgeries for Dr. Ennix and Other Surgeons



STS 2004 Statistics for Sternal Wound Infection:

- CABG only = 0.5%
- Isolated Valve = 0.6%
- CABG + Valve = 1.1%